Prospective Study

Weight changes (in Kgs) after MMF in patients undergoing treatment for mandibular fractures

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Abstract

Background: *This study aimed to determine the pattern and degree of weight loss in patients who have undergone treatment for maxillofacial fractures by the method of maxillomandibular fixation (MMF). Maxillomandibular fixation is a closed reduction technique that interferes with normal nutrition and dietary intake especially of solid and semisolid foods and thus results in weight loss and malnutrition, which in turn can affect the patient's recovery. Therefore, in this study, we explain the degree and pattern of weight loss of patients who have undergone treatment with MMF.*

Materials and Methods: *In this study, 400 patients were treated with 4-6 weeks of MMF. The patient's weight was measured and compared before and after the treatment.*

Results: *Patients' weight decreased during the MMF period, and this decrease was highly statistically significant ($P < 0.001$).*

Conclusion: *Although no severe and acute malnutrition was seen among our patients, MMF led to mild to moderate malnutrition in some cases. It is therefore mandatory to use nutritional supplements in patients undergoing maxillomandibular fixation.*

Key Words: *Maxillomandibular Fixation (MMF), Mandibular fractures.*

Introduction

Maxillofacial injuries commonly occur due to motor vehicle accidents, falls, insults and sports accidents **(**1-2**)**. Mandible fractures have a high incidence in maxillofacial injuries and can be treated in two ways. The first treatment option is the surgical open reduction technique, which is carried out by surgical incisions and the fractured segments are visualized reduced and fixed with screws, plates and wires. The second option is closed reduction with the use of mandibulomaxillary fixation (MMF), in which the fractured segments and jaws are immobilized adjacent to each other and this procedure results in the reunion of the separated segments **(**3-4**)**. Even though MMF may result in some complications like malunion, non-union, malnutrition and periodontal inflammation, it is used very commonly **(**4**)**.

The duration of MMF depends on the type and location of the fracture, health condition and age of the patient and some other factors, but it is usually 3 to 6 weeks **(**5-6**)**. During the MMF period, the patient's intake of food is affected because of the maxillomandibular fixation. Many studies have shown a direct relationship between nutrition and the healing process of the body **(**6**)** so treatment with MMF could affect the healing process. The advantages of MMF are that it is inexpensive and non-technique sensitive. But MMF is not without risk, Patients may vomit and intraoral bleeding may go undetected. Patients may lose weight with MMF **(**4-5, 13**)**.

Patients with respiratory disorders such as asthma have been shown to have deterioration in their respiratory function. Patients also found it difficult to bear MMF. Patients have difficulty in maintaining a normal diet, oral hygiene **(**3,6**)**. There are possible temporomandibular joint sequelae, muscular atrophy and stiffness, denervation of muscles due to alterations in fiber types, irreversible loss of bite force, weight loss and risk of inflicting injuries to operators, manipulating wires **(**7-10**)**. Maxillomandibular fixation is a closed reduction technique that interferes with normal nutrition and dietary intake especially of solid and semisolid foods and thus results in weight loss and malnutrition, which in turn can affect the patient's recovery. Our aim of the study is to explain the degree and pattern of weight loss of patients who have undergone treatment with MMF.

Materials and Methods

The study was conducted in Oral and Maxillofacial Surgery Department, GDC Srinagar and Jammu and Dental section GMC Baramulla. A total of 400 patients with Mandibular fracture were included in the study. Out of these 360 patients were males and 40 patients were females.

Age ranged from 18 -40 years. The pre MMF weight ranged from 42 to 92 kgs. All patients were treated with Maxillomandibular fixation (MMF) for 5-6 weeks. Patients were weighed pre-operatively, 1st-week postoperatively and 5th-week postoperatively. None of the patients received any supplements during the treatment period. After the completion of the treatment the patients underwent weight measurements again and compared and analysed statistically by ANOVA

Results

In the study of 400 patients with Mandibular fracture after the treatment period, 6 patients suffered from mild malnutrition. Comparison of pre-op, first-week post-op and fifth-week post-op are shown in Table 1 and Figure 1. The overall average weight loss sustained by patients in this study was 4.7_+ .41 kilograms (Kgs) at the end of the first-week post operatively and 4 kilograms (Kgs) at the fifth-week post operatively when compared with their weights before surgery. Within the limitations of this study, significant weight loss was observed in the first-week post operatively among all patients. The overall weight loss sustained by patients in this study was 4.7_+ .41 kgs after the first-week post-MMF and 4.0_+ .21 kgs in the fifth week after MMF when compared with their weights before surgery. Table 1 shows a Comparison of weight in terms of {Mean (SD)} at different time intervals using the ANOVA test. The Pre-operative Mean weight was 68.97(69) Kg, Post-operative 1 week Mean weight was 64.29 Kg, Post-operative 5week Mean weight was 64.85 Kg.

Table 1: Comparison of weight in terms of {Mean (SD)} at different time intervals using Repeated measures ANOVA test

Time intervals	N	Mean	Std. Deviation	Wilk's Lambda value	P value
Pre-operative	400	68.97	11.250	11537.487	<0.001**
Post-operative 1 week	400	64.29	11.294		
Post-operative 5 week	400	64.85	11.286		

(p< 0.05 - Significant*, p < 0.001 - Highly significant**)

(Bonferroni's post hoc analysis)

	Pre-operative	Post-operative 1 week	Post-operative 5 week
Pre-operative	-	<0.001**	<0.001**
Post-operative 1 week	<0.001**	-	<0.001**
Post-operative 5 week	<0.001**	<0.001**	-

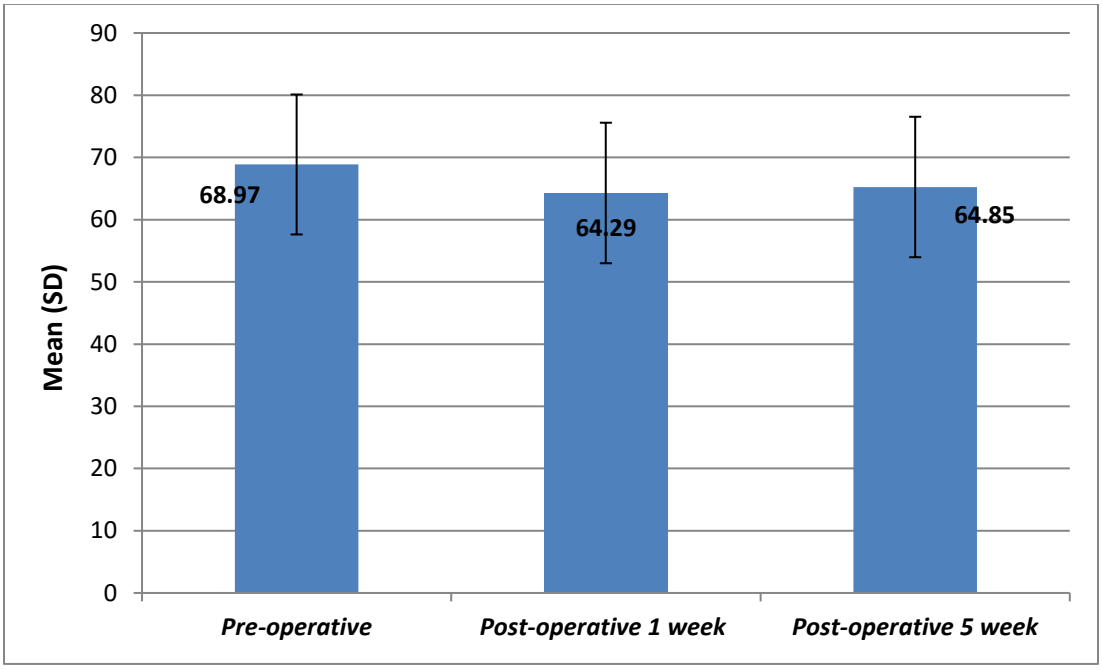

Figure 1: Comparison of weight in terms of {Mean (SD)} at different time interval.

Discussion

Many oral and maxillofacial surgical interventions compromise a patient's ability to eat and drink in the early postoperative period. Most of the patients undergoing simple dentoalveolar surgery find it uncomfortable to eat normally for the first 24 to 48 hrs but soon after able to resume a normal diet. **(**3-5**)** Patients undergone orthognathic surgery or who have fractured their jaws are unable to take a normal diet for 6 to 8 weeks. **(**9,11-12**)** Surgery and anaesthesia disrupt the metabolic steady state, initiate a catabolic process which is intensified by periods of limited nutritional intake. The normal adult requires 1800 to 2000 calories per day. So, muscles are catabolized for glucose production (gluconeogenesis) early in this phase, with additional protein breakdown from the metabolically active tissues that have been wounded surgically. **(**13**)**

In this study, the average weight loss sustained by patients was 4.7Kgs at the first-week post-op due to a decrease in carbohydrate and protein intake. All patients in this study had Mandibular fractures and were treated with MMF alone. Patients had difficulty in maintaining nutrition during the first-week postoperatively but soon adjusted to liquid diet after one week.

In this study, the only Weight of the patient was noted irrespective of their nutritional diet, socioeconomic status, healing and postoperative complications. The overall weight loss in this study is 4.8Kgs which is in comparison with the study done by Worrall SF et al in which total weight loss was 4.6 Kgs.**(**13**)** Furthermore, patients started to gain weight by the 4th post-operative week and there was no significant difference from the preoperative weight of patients.**(**3**)** In other similar studies, no significant weight loss was observed after 04 to 06 weeks of MMF. In another study in which MMF was used to control obesity also showed that prolonged use of MMF had no significant effect on the weight of the patient. **(**14-16**)**

In this study weight measurements were obtained from patients and the results were analysed. As mentioned previously, the patients in this study lost an average weight of 4.8kg during the period of MMF, which was expected due to the lack of consumption of a normal diet. Similar studies have confirmed these changes in weight because of MMF.**(**17**)** Ellis showed a weight loss of 4.5 kg during 6 weeks of treatment;**(**18**)** also, Luhr et al showed an average weight loss of 4.1 kg during 3.5 weeks.**(**19**)** In a study in 2004, MMF was used as a treatment for patients who suffered from obesity; they lost an average weight of 7.4 kg.**(**20**)** Although the weight loss showed in this study was less than other similar studies, however, the pattern of reduction is similar. Weight loss of more than 10% of body weight is a sign of malnutrition. **(**21**)** as weight loss did not reach 10% in our study, thus we can assume that treatment with MMF for 5 -6 weeks did not result in malnutrition as patients adapt to liquid diet after a brief period of few days.

Conclusion

In conclusion, this study shows that with the local nutritional habits, based on the patient's weight and anthropometric indexes, treatment with MMF can result in weight loss and mild nutritional deficiency, though not malnutrition. As mentioned before, good nutrition is the key for better and faster recovery; therefore, when closed reduction techniques are used for treatment in the maxillofacial Trauma, a supplemental nourishment planning is mandatory mostly in liquid form as MMF restricts the use of solid and semisolid diets...

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